

opening/holding device 50 may run according to the following program, except when a marker 30 calls for a deviation from the program:

1. The next sample beaker 32 in line is advanced clockwise  
5 to the lid-opening device 50 while, preferably, another, already opened sample beaker 32 is moved into position at the analyzer module 16.
2. The lid-opening magnet (to be described later) or another lid-opening actuator is energized while at the same time  
10 the holder 22 for the analytical instruments (electrodes, pipettes, etc.) is lowered into the beaker 32 that is positioned at the tower 16. The analysis is carried out, and the holder 22 is raised again, so that the  
15 instruments are retracted from the beaker 32. As an optional step, the instruments may also be washed at this time.
3. The sample beaker 32 that has been analyzed in step 2 is moved back (in counterclockwise direction) to the lid-  
20 opening/holding device 50 where the lid 32' has been held during the analysis.
4. The lid 32' is put back on the beaker containing the sample that was analyzed in step 2.
5. The cycle is repeated with the next following sample, starting again with step 1.

25 In a preferred program sequence, where the lid is kept off only during a minimum amount of time, the first

series of sample beakers is preceded by a conditioning beaker 32a without a lid. The preferred program has these steps:

1. The first sample beaker is advanced clockwise to the lid-opening device 50 for removal of the lid 32'.

5 2. The sample tray 4 is moved counterclockwise until the conditioning beaker 32a is positioned at the lid-opening device 50. The lid 32' removed from the sample beaker in step 1 is put on the conditioning beaker 32a.

10 3. The sample tray 4 is advanced clockwise until the open sample beaker 32 is positioned at the tower 16, and the analysis is performed. As the tower 16 and the lid-opening device 50 are set only one step apart, the next following sample beaker 32 is now positioned at the lid-opening device 50.

15 4. The lid 32' is taken off and the sample tray 4 is rotated counterclockwise until the preceding sample beaker is positioned at the lid-opening device 50. The lid that has been held by the device is put on the preceding sample beaker.

20 5. The steps 3 and 4 are repeated until the series of sample beakers has been processed. In each subcycle 3-4, the lid of the new sample beaker is put on the preceding sample beaker. The series of sample beakers is followed at the end by a conditioning beaker 32a with a lid on, so  
25 that the last sample beaker in the series can likewise be closed with a lid after it has been analyzed.

Fig. 2 illustrates a preferred design of a lid-opening/holding device 50 with a particularly preferred embodiment of a lid 32'.

As may be seen in Figures 1 and 2, the lid-opening/holding device 50 has a substantially horizontal arm 50a reaching out over the sample beakers 32 on the sample tray 4. The arm 50a contains a lid-opening actuator that is preferably controlled by the computer 12 and/or the computer keypad 112 or 112'. In the preferred case, the lid-opening actuator is constituted by an electromagnet 51 that is connected to the computer by an electrical connection 11". An amplifier for the energizing current for the magnet can be accommodated at an arbitrary place, e.g., inside the housing of the computer 12. Thus, a coil 51' of the electromagnet 51 can be energized by the computer 12 by closing a switch S (Fig. 1) at a time that is prescribed by the program.

Given that, for practicality, the sample beakers 32 come up to a predetermined height from the seating cutouts 5 (i.e., only standardized sample beakers 32 are used), the lids 32' will likewise be of a known height H. As a practical design arrangement, a distance of at least 2H between the lid and the magnet should be chosen in order to allow the free passage of samples below the arm 50a even if two lids 32' are set on top of each other on a beaker 32 because of a malfunction or an operator error.

The electromagnet 51 can, in principle, be of an arbitrary shape, e.g., a bar magnet. However, it has been